

## Section 2

# Master Responses

This section contains master responses that address frequently expressed comments and major issues that were raised during the public comment period. Many comments relating to project alternatives were submitted. Several commenters expressed a preference to fully evaluate non-highway alternatives, and specifically, transit-only options, before considering construction of a new highway. Consideration of a broad range of alternatives was another frequently raised issue. Utahns for Better Transportation (UBET) and the Sierra Club presented a revised version of their proposed alternative (the UBET Alternative), and many of the comments expressed support of or opposition to that alternative.

In addition, many of the comments received related to various technical resource topics addressed in the Supplemental EIS. In particular, many commenters expressed concern about impacts related to air quality, water quality, wildlife, wetlands, property displacement, and community cohesion.

Master responses to these recurrent comments are provided in this section. The master responses are numbered, MR-1 thru MR-7. Sections 3 through 7 of this volume provide a response for each substantive comment received on the Draft Supplemental EIS. In many cases, however, there is no specific response provided in those sections; rather, the response refers by number to a specific master response. The master responses are provided below.

### **MR-1—Consideration of Non-highway Alternatives**

Non-highway alternatives to the proposed action were evaluated and are discussed in Section 3.1.1, *Non-highway Alternatives*, of the Supplemental EIS. As disclosed therein, the traffic modeling analysis shows that none of the non-highway alternatives alone would provide enough capacity to meet the transportation demand anticipated in 2020. In fact, even if a full array of non-highway alternatives, with certain highway improvements, were implemented—including increased transit, two additional lanes on I-15, and enhanced transportation management—the anticipated demand could not be met. As described in Section 3.2.2, *Results of Additional Alternatives Evaluation*, of the Supplemental EIS, without implementation of Legacy Parkway, I-15 would operate at level of service (LOS) F in 2020, even with full implementation of arterial road improvements, transportation management strategies, and an expanded mass transit scenario. LOS F does not meet the purpose and need of the proposed action.

It should be noted that the Shared Solution for addressing transportation needs in the North Corridor in 2020 incorporates many non-highway transportation improvements—including transportation demand management strategies; substantial expansion of mass transit, including commuter rail; and improvements to existing local roads—in addition to construction of Legacy Parkway and expansion of I-15.

## **MR-2—Reasonable Range of Alternatives**

NEPA requires that an EIS consider reasonable alternatives that could accomplish a proposed action's purpose and need. The Supplemental EIS presents the results of analysis of a broad range of alternatives, including non-highway alternatives, expansion of I-15, five regional alignment alternatives (including five specific alignments within the D&RG Railroad corridor), four specific build alternatives within the Great Salt Lake corridor, arterial alternatives, and a no-build alternative. Based on comments received on the Draft Supplemental EIS, additional consideration was given to alternatives involving Redwood Road and the Redwood Road corridor. The Supplemental EIS also presents alternative ways of implementing Legacy Parkway, and incorporates some of those implementation alternatives into the proposed action. All of these reasonable alternatives to the proposed action have been evaluated, and all reasonable and practicable alternatives that would meet the project purpose and need have been carried forward for detailed environmental review in the Supplemental EIS.

## **MR-3—Regional Air Quality Impacts**

As discussed in Section 4.8, *Air Quality*, of the Supplemental EIS, air pollutant emissions in 2020 under the Legacy Parkway build alternatives are predicted to be similar to emissions under the No-Build Alternative. Regardless of whether the proposed action is implemented, mobile source air emissions in the study area are projected to decrease substantially by 2020, and emissions differences between the build and no build alternatives would be minimal. Some emissions will slightly increase under the build alternatives compared to the No Build Alternative, and others will slightly decrease; the change in either direction would be approximately one-half of one percent. Table 4.8-3 of the Supplemental EIS shows that the projected vehicle miles traveled (VMT) in 2020 under the No-Build Alternative (48.15 million miles/day) would be similar to projected VMT under the build alternatives (48.08 million miles/day). These figures, which are based on the Wasatch Front Regional Council's (WFRC's) 2004 travel demand model, indicate that VMT in the study area would increase to a similar level with or without the proposed action, and the effect on regional air quality would be similar regardless of whether the project is implemented. Also, irrespective of the proposed action, the model results show that air quality in the region is expected to improve in the future due to more efficient vehicles and tighter regulatory controls on emission sources (both mobile and stationary).

Section 4.8.3.2, *Mesoscale Evaluation*, of the Supplemental EIS describes in detail the effects that the proposed action would have on regional air quality. As described in that section, the most recent regional conformity analysis for the study area (completed by WFRC in 2003) concludes that the updated 2030 long range transportation plan, which includes the proposed Legacy Parkway, conforms to the state implementation plan for all air pollutants. Although the regional conformity analysis demonstrates that future transportation emissions, including those from the Legacy Parkway project, would not cause ambient concentrations to exceed National Ambient Air Quality Standard (NAAQS) limits, a revised mesoscale analysis was prepared for the Supplemental EIS to identify potential differences in regional emissions between the No-Build and proposed build alternatives in 2020. This additional analysis indicates that implementation of the build alternatives would have a minor impact on overall regional air emissions relative to the No-Build Alternative in 2020.

## **MR-4—Changes in Growth and Development Patterns**

The Supplemental EIS examines the issue of induced growth. As stated in Section 4.1.3, *Environmental Consequences and Mitigation Measures*, of the Supplemental EIS, the analysis concludes that development within Davis County would be essentially the same with or without Legacy Parkway, although implementation of a build alternative would likely result in some changes in the type and timing of development, particularly in the areas of the proposed Legacy Parkway interchanges. Regardless of whether Legacy Parkway is constructed, however, local land use planners and officials predict that the study area will be almost completely built out by the end of the study period. As explained in the 2000 Final EIS and the Supplemental EIS, the study area contains desirable, developable land, which is confirmed by the fact that development has occurred and been approved since the Final EIS in 2000 and since the Draft Supplemental EIS. The Supplemental EIS also addresses potential effects on growth and development trends in southern Weber County and the City of Ogden to the north of the project area. As stated in Section 4.1.3.3 of the Supplemental EIS, the analysis concludes that it is unlikely that adoption of the Legacy Parkway project would induce growth in that area beyond what is already expected/planned to occur and projected growth trends in Weber County are not expected to change substantially.

Legacy Parkway and other components of the Shared Solution have been planned for many years to meet anticipated planned growth in the North Corridor region. Since the original Draft EIS was published in 1998, the regional growth has occurred as anticipated, even without construction of Legacy Parkway. Review of land use plans of the local jurisdictions in the region and of the actual approved development since 1998 has confirmed the information presented in the Draft EIS, the Final EIS, and this Supplemental EIS concerning patterns of land use and growth. As reflected in the Final EIS and this Supplemental EIS, construction of Legacy Parkway may change the timing of some of the land development (that is, certain locations may be developed at a different time than would occur without Legacy Parkway). For example, if Legacy Parkway were implemented, development in the areas around the proposed interchanges could be accelerated compared to when it would occur without implementation of Legacy Parkway. However, Legacy Parkway is not anticipated to affect long-term changes in growth patterns in the study area or the region.

In response to comments received during the Supplemental EIS scoping process, the Supplemental EIS analysis considers the following two land use scenarios in addition to the official WFRC land use base.

- A transit-supportive land use scenario, included in the “maximum future transit” analysis (described in Chapter 3, *Alternatives*, and Section 2.3, *Integration of Legacy Parkway with Mass Transit*, in Volume 1 of this Final Supplemental EIS).
- An alternative development pattern that would result from greater land availability in south Davis County under the No-Build Alternative (described in Section 4.1.3.3, *Impacts on Growth within and Beyond the North Corridor*, and in Appendix B, Section B5.1, in Volume 1 of this Final Supplemental EIS).

The transit-supportive land use scenario, coupled with a range of transit service improvements, would increase transit mode share under the Shared Solution from about 4.6 percent to about 5.3 percent, as described in Section 2.3.2, *Summary of Integration Analysis*, in Volume 1 of this Supplemental EIS.

If Legacy Parkway were not built, approximately 800 acres of developable land would become available for development in the area of North Salt Lake, Centerville, Farmington, Woods Cross, Bountiful, and West Bountiful. Under the No-Build Alternative, development that is not currently anticipated in the WFRC forecasts could occur on this land by 2020. Although such development shifts are speculative, if

they did occur, they would worsen 2020 traffic conditions in the North Corridor under the No-Build Alternative, as noted in Section B5.1 of Appendix in Volume 1.

## **MR-5—UBET Proposed Alternative**

The Sierra Club and Utahns for Better Transportation (UBET) have forwarded an alternative they call the “Citizen’s Smart-Growth Alternative” (referred to herein as the UBET Alternative). Prior to publication of the Draft Supplemental EIS, UBET had recommended that the federal lead agencies consider an alternative that involved a Redwood Road arterial in lieu of Legacy Parkway. To address that suggestion, the Redwood Road Boulevard Sub-alternative was evaluated in the Draft Supplemental EIS. As stated in Section 3.2.2, *Results of Additional Alternatives Evaluation*, of the Supplemental EIS, the Redwood Road Boulevard Sub-alternative was eliminated from further analysis because it would not draw enough of the through-corridor trips off I-15 to meet the peak-period LOS D criterion, the primary criterion for determining whether the project would meet the purpose and need.

UBET submitted a more detailed description of its proposed Redwood Road Boulevard alternative, which is the UBET Alternative noted above, with its written comments on the Draft Supplemental EIS in March 2005. The UBET Alternative was evaluated and subjected to the same screening criteria described and applied in Chapter 3, *Alternatives*, of the Final Supplemental EIS. Results of that analysis are presented in Chapter 3 of this Final Supplemental EIS.

### **Description of UBET Alternative and UBET-Proposed Transportation Network Assumptions**

The federal lead agencies analyzed the UBET Alternative to allow fair and accurate comparisons with other alternatives presented in the Supplemental EIS. Consistent with the other alternatives evaluated, the UBET Alternative was analyzed using WFRC model version 3.2 and the integrated transit and land use configuration described in Section 2.3, *Integration of Legacy Parkway with Mass Transit*, in Volume 1 of this Supplemental EIS. This transit and land use configuration, which was developed in cooperation with local and regional planning representatives, is referred to in the Supplemental EIS as the maximum future transit scenario. The transit enhancements and land use assumptions for the maximum future transit scenario exceed the enhancements and assumptions incorporated in the WFRC long range transportation plan.

As with the analysis of the Legacy Parkway alternatives, the highway system improvements assumed for the analysis of the UBET Alternative reflect the end of the second phase of the WFRC long range transportation plan, except that the Legacy North project is not included, consistent with assumptions for all other alternatives analyzed. In addition, for the analysis of the UBET Alternative, the Legacy Parkway is not included.

For analysis of the UBET Alternative, from I-215 north to 500 South, Redwood Road is configured as a boulevard comprising between four and six lanes (four through-travel lanes plus access lanes where fronting land use dictates), with at-grade access to adjacent parcels and cross streets via frontage roads, roundabouts, or other intersection treatments, as appropriate. As proposed by UBET, this configuration of Redwood Road would provide an average travel speed of 45 miles per hour (mph) along its entire length under uncongested traffic conditions. This speed matched the travel speed specifically proposed by UBET in its description of the Redwood Road boulevard concept. From 500 South to Parrish Lane, the Redwood Road arterial would be extended on a new alignment with four through-travel lanes. North of Centerville, the alignment would be an at-grade four-lane parkway arterial that follows the currently proposed Legacy

Parkway alignment west of I-15 and terminates at the local street network within the proposed Farmington transit-oriented development.

UBET's comments suggested that, north of Centerville, the alignment could run either east or west of I-15. The evaluation of the UBET Alternative for the Supplemental EIS included a test of the transportation performance of both the eastern and western alignments. The western alignment resulted in slightly better travel conditions on I-15. Further refined analyses of the UBET Alternative were based on the western alignment of Redwood Road in order to focus on the alignment variation that provided greater potential for meeting project purpose and need and generated lower impact on established neighborhoods east of I-15. The further analysis involved varying the configuration of I-15.

To capture the different options presented in UBET's comments, the UBET Alternative was initially analyzed with two optional configurations for I-15.

- Under Option 1, the UBET Alternative was analyzed assuming I-15 is configured as the Preferred Alternative in the I-15 North Corridor draft EIS. This option was considered the "10-lane I-15" configuration, and comprises four general-purpose lanes and one high-occupancy vehicle (HOV) lane per direction.
- Under Option 2, I-15 is assumed to include four general-purpose lanes in each direction, with two limited-access reversible lanes for HOVs. Both reversible lanes would be open for northbound travel during the p.m. peak period and for southbound travel during the a.m. peak period. The termini of the reversible lanes are I-15, south of the I-215 interchange, and 200 North in Kaysville. The reversible lanes are configured in the model as general-purpose lanes with travel model post-processing used to account for the desired high-occupancy vehicle/high-occupancy toll lane (HOV/HOT) configuration. For purposes of forecasting with the travel demand model, there was little difference in treating the reversible lanes as either HOV or HOT.

## Evaluation of UBET Alternative

During the public comment period on the Draft Supplemental EIS, numerous iterations of six different model scenarios were conducted at UBET's request to assist UBET in refining its proposed alternative. These scenarios and iterations varied in the alignment of the Redwood Road extension, the configuration of I-15, the land use assumptions, and the transit system assumptions. At the end of the public comment period, another seven model runs were conducted as part of the analysis to ensure full and complete responses to comments regarding the UBET Alternative. Descriptions and analyses of the resulting three principal UBET Alternative options (Option 1, Option 2, and a Refined Option) are presented in the technical memorandum *Evaluation of UBET Proposals for North Corridor Transportation and Land Use* (Fehr and Peers 2005). The other scenarios analyzed investigated the effect of incorporating the land use assumptions suggested by UBET (see Master Response 6 below) and other less-effective configurations of I-15, including variable terminal points and access configurations for the reversible lanes on I-15. The lead agencies also evaluated the UBET Alternative under both these optional configurations for I-15, as well as under a refinement of the second option, which provides more efficient use of the reversible lanes by allowing travelers on I-15 more access to the reversible lanes than under the configuration proposed by UBET.

On the basis of these analyses, the UBET Alternative was eliminated from further consideration because none of the UBET Alternative options or refinement of those options would meet the primary project purpose and need, as reflected by their failure to provide enough additional capacity to allow I-15 to operate at a minimum of LOS D in the peak period through 2020. In sum, under any of the optional I-15

configurations, the UBET Alternative would result in an unacceptable level of service, as detailed in the following bullets.

- Unacceptable level of service in the general-purpose travel lanes on I-15.
  - ❑ Under Option 1, unacceptable LOS F in the general-purpose lanes on I-15, with HOV lanes operating at the LOS C/D threshold. The mixed-flow general lanes on I-15 would average LOS F on a daily basis for the full 3-hour p.m. peak period.
  - ❑ Under Option 2, unacceptable LOS E in the general-purpose travel lanes on I-15, with HOV/HOT lanes operating at LOS B. These represent averages of the 3-hour p.m. peak period; the general-purpose lanes on I-15 would operate at LOS E/F or F for at least the full 1-hour p.m. peak, and the HOV/HOT lanes would operate at LOS D for at least the same hour.
  - ❑ Under the Refined Option, unacceptable LOS E in the general-purpose travel lanes on I-15, with HOV/HOT lanes operating at the LOS C/D threshold. These represent averages of the 3-hour p.m. peak period; the general-purpose lanes on I-15 would operate at LOS E/F or F for at least the full 1-hour p.m. peak, and the HOV/HOT lanes would operate at LOS D for at least the same hour.
- Unacceptable corridor-wide system and segment level of service. Under the UBET Alternative, three of the ten northbound segments of I-15 would operate at LOS E for the 3-hour p.m. peak period.

The UBET Alternative also fails to reasonably meet the secondary project purpose of providing an adequate alternate north/south route, because a lower speed arterial does not perform in the same manner as a through-corridor, limited-access highway. The UBET Alternative results in about 855 long-distance through-corridor vehicles using parallel local streets, in addition to over 3,000 through-corridor vehicles using Redwood Road. None of the options suggested under the UBET Alternative would protect local streets from long-distance through-corridor traffic. Thus, while, the UBET Alternative would provide an alternate route for some vehicles, it would not completely provide an adequate alternate north/south route. The UBET Alternative is only able to reduce the through-corridor traffic on local streets to 60 percent of what it would be under the No-Build Alternative. Conversely, the Shared Solution would eliminate all through-corridor traffic on local streets.

In addition to failing to meet the level of service and alternate route criteria stated in Section 1.1.3, *Purpose of Legacy Parkway Project*, with respect to mobility, the UBET Alternative also fails to perform as well as the Shared Solution when measured in terms of vehicle miles traveled (VMT), vehicle hours traveled (VHT), and speed in the corridor. It results in reduced mobility in the region compared to the Shared Solution, as indicated by slightly lower VMT and VHT, slower travel speeds, and longer trip times. The UBET Alternative performs between 1 and 3 percent worse in terms of corridor mobility (VMT) and travel delay (VHT and speed) than the Shared Solution.

As detailed in the following bullet list, certain basic components of the UBET Alternative (under all options evaluated) can be identified that explain why the alternative is neither reasonable nor effective, and may also explain why the UBET Alternative fails to meet project purpose and need.

- The Redwood Road Boulevard proposed in the UBET Alternative, with either roundabouts or other intersection treatments, would operate at speeds at least 20 mph slower than a freeway facility at LOS C or D, and would not provide a competitive travel path for through-corridor trips. Travelers will select the most efficient available route. The freeway would have to operate at LOS E or F for the

Redwood Road Boulevard to provide a faster route through the corridor for long-distance travelers. LOS E or F is an unacceptable performance level for I-15.

- Since the Redwood Road Boulevard cannot provide an attractive alternate route for through-corridor travel, except under conditions of unacceptable congestion on I-15, the four- to six-lane boulevard is forecast to operate at volumes approaching half its capacity. It does not provide a useful travel path for a large, long-distance travel market. The Redwood Road Boulevard would not serve as an effective reliever for I-15.
- UBET's conclusion that the UBET Alternative would meet purpose and need is based on a number of errors.
  - The highway analysis that UBET submitted does not accurately represent UBET's proposed alternative because it uses higher-capacity facilities than were described in the definition of the UBET Alternative. That is, UBET apparently modeled a different set of road configurations than it described in their text version of the alternative. While UBET describes a four- to six-lane arterial as its proposed alternative, the UBET model analysis uses an eight-lane Redwood Road expressway, similar to Bangerter Highway, with higher right-of-way requirements, more local access, and higher community impacts than UBET described for its proposed alternative.
  - The alternative analysis performed by UBET included incorrect reversible lane coding because access to the lanes was not restricted in any way, which led to the lanes operating without barriers to protect on-coming traffic. This error is likely to result in unrealistically high travel forecasts.
  - The UBET analysis makes average vehicle occupancy (AVO) adjustments to the modeling that are not appropriate given the demonstrated ability of the WFRC model to produce valid AVO forecasts without further adjustments.
  - The UBET analysis uses AVO forecasts that are unprecedented in both the Salt Lake region and other larger urban areas and that are contrary to the current trends in HOV use. That is, UBET's analysis assumed that HOV lanes would attract more persons per vehicle than the data supports.

Furthermore, much of the information provided in the UBET comments on the Draft Supplemental EIS, as exemplified in the following bullet list, confirms that the Shared Solution would offer travel benefits throughout the corridor, including the ability to relieve a regional bottleneck.

- As shown in Figures 17 and 18 (pages 46 and 47 of the UBET Smart Mobility comment document), the Shared Solution with Legacy Parkway relieves about 20 miles of freeway on I-15 and I-215 from LOS E or F to acceptable levels of service.
- Conditions on the freeways upstream and downstream of the North Corridor are similar or better under the Shared Solution than under the UBET Alternative.
- The graphics on page 13 of the UBET comment document show the level of service on I-15 within the North Corridor is LOS D or better under the Shared Solution but LOS E and F under the UBET Alternative.
- As Figure 17 on page 45 of the UBET comment document indicates, mile-for-mile, I-15 in the North Corridor operated at a considerably worse level of service in 2001 than did the regional freeway system as a whole.

- Sufficient traffic reaches I-15 through the North Corridor today (Figure 17 on page 45 of the UBET comment document) to cause traffic backups entering and through the corridor, while downstream freeways operate at acceptable levels of service.

## Conclusions

For the Final Supplemental EIS, the federal lead agencies evaluated the UBET Alternative using the two options for network configurations of I-15 proposed by UBET and a refinement of the second option. Neither the options nor the refinement of the UBET Alternative would meet the purpose and need related to transportation improvements in the North Corridor. The UBET Alternative, under both options and the refinement, would have the following results.

- Inability to provide acceptable level of service in the p.m. peak period in the northbound direction. The UBET Alternative as proposed would operate at LOS E or F.
- Lack of a reasonably effective alternate route for through-corridor traffic, and therefore, greater impacts of through-corridor traffic on local streets.
- Reduced mobility in the region compared to the Shared Solution, as indicated by slightly lower VMT and VHT, slower travel speeds, and longer trip times.

For a full disclosure of the literature cited; analyses performed; and tools, methods, and criteria used to evaluate the UBET Alternative, refer to *Evaluation of UBET Proposals for North Corridor Transportation and Land Use* (Fehr & Peers 2005).

## **MR-6—UBET Proposed Land Use Assumptions**

In its comments on the Draft Supplemental EIS, UBET proposed that the federal lead agencies use an alternate set of land use forecast assumptions as part of the basis for evaluating the performance of UBET's proposed alternative (see Master Response 5 above) and the other alternatives evaluated in the Supplemental EIS. The alternate land use assumptions involve shifting both employment and housing locations within the corridor to the degree that there would be a substantial reduction in projected travel demand (largely on the premise that people would live closer to their jobs and other needs, resulting in less need to travel). UBET considers that this alternate set of land use assumptions would result in reduced need for transportation improvements in the North Corridor and would enhance the performance of its proposed alternative. UBET asserts that its alternate land use forecast assumptions correct what it considers are land use imbalances in the corridor. UBET hypothesizes that, with these alternate land use assumptions implemented, divergent market assumptions and government efforts to assist transit-oriented development (TOD) could create more jobs in the northern part of the corridor.

In evaluating UBET's proposed alternate land use assumptions, the lead agencies considered two main issues: (1) whether the shifts in employment and housing represent reasonable projections, and (2) whether such land use assumptions affect conclusions in the Supplemental EIS about the North Corridor transportation needs and alternatives analysis. The lead agencies reviewed the reasonableness of the alternate land use forecast assumptions by comparing them with official land use projections and regional transportation plans, including evaluations conducted for the Supplemental EIS. The lead agencies also assessed whether the assumptions would reduce travel demand in the corridor sufficiently to affect



conclusions about transportation needs in the North Corridor and the analysis in the Supplemental EIS of the UBET Alternative and other alternatives.

## Reasonableness of UBET-Proposed Land Use Assumptions

The land use assumptions used in the Supplemental EIS are appropriate and reasonable. For the Supplemental EIS analysis, FHWA and the Corps relied on state, regional, and local projections of population distribution and land use. For consistency with the adopted regional transportation plan and regional air quality conformity determinations, the Supplemental EIS is based on the officially adopted regional land use forecasts. The Shared Solution for the North Corridor, including Legacy Parkway, is consistent with the following existing plans and policies: *Wasatch Front Urban Area Long Range Transportation Plan Update 2004–2030* (Wasatch Front Regional Council 2003a); *Salt Lake and Ogden-Layton Urbanized Areas Congestion Management System Report* (Wasatch Front Regional Council 2004); increased transit funding allocations to Salt Lake, Davis, and Weber Counties; and Transit 2030 Committee recommendations (Wasatch Front Regional Council. 2003. Transit 2030 Committee. Available: <http://www.wfrc.org/reports.>)

The lead agencies rely on established local land use plans because federal agencies have no authority to make local land use choices, including locations and nature of housing or places of employment. Nonetheless, the lead agencies included information in the Supplemental EIS using two variations of the adopted regional land use forecasts. These variations are described in the following bullet list. These variations were evaluated to respond to issues raised during scoping (by UBET and others) that the lead agencies should assess how and whether changes in land use might affect transportation choices, including encouraging a higher level of transit ridership than the adopted regional land use forecasts.

- In response to comments received during the scoping process, the Supplemental EIS presents a scenario that makes adjustments to land use allocations within individual cities. These adjustments are (1) consistent with the adopted regional forecast, (2) deemed reasonable and acceptable by planning representatives of the affected cities, and (3) reflect a reasonable bias towards transit-supportive land use. These adjustments, described as “maximum” or “robust” future transit, are explained in the Supplemental EIS transit integration analysis in Section 2.3, *Integration of Legacy Parkway with Mass Transit*, of the Final Supplemental EIS. The TOD land use shifts developed for the Draft Supplemental EIS transit integration analysis shifted about 17 percent of the expected growth in the corridor to locations within transit station areas. These shifts in land use density represent the maximum level considered feasible by local planning representatives from the North Corridor communities.
- The supplemental EIS also considers the possibility that there would be a different land use pattern in the corridor if Legacy Parkway were not built. The assessment concludes that, under the No-Build Alternative, if the Legacy Parkway right-of-way and preserve were relinquished, the density of land development in the corridor in 2020 could be higher than under the Shared Solution. That is, additional land would be available for development and would be developed. As a result, traffic impacts under the No-Build Alternative would be greater on local streets in the western areas of the North Corridor and on I-15 than under any build alternative.

The UBET comments characterize official land use forecasts as reflecting a “worsening” of jobs/housing balance in the North Corridor compared to current conditions. The lead agencies do not accept that land use forecasts either “worsen” or “improve,” nor do they make any judgments about forecasts of land use. However, it is worth noting that the official forecasts upon which the Supplemental EIS relies actually

project that both the number of households with local jobs and the percentage of households with local jobs will increase in the North Corridor by 2020, representing a trend toward more a greater balance of jobs and housing in the corridor. The Supplemental EIS conclusions concerning the ability of the Shared Solution and other project alternatives to meet the purpose and need are based on and/or consistent with the above land use plans, projections, and assumptions. They take into consideration the total amounts of growth, a more balanced jobs/housing ratio in the future projected by WFRC, and the full range of other factors (described below) that influence travel demand.

The fundamental concepts underlying the alternate land use assumptions proposed by UBET are not reasonable. UBET speculates that if Legacy Parkway were not built, the real estate market would shift regional land use patterns resulting in the employment and housing distribution projected in its alternate set of land use assumptions. This basic premise is unsupported. There is limited support for the underlying premise that elimination of a planned highway from a regional corridor already served by a major freeway and premium transit could suppress land development in the corridor (Transportation Research Board. 1998. *Transit Markets of the Future: the Challenge of Change*. Transit Cooperative Research Program Report 28).

UBET's comment that the WFRC land use forecasts represent a less balanced jobs/housing ratio is unfounded. As noted above, the official forecasts upon which the Supplemental EIS analysis relies project that both the number of households with local jobs and the percentage of households with local jobs will increase in the North Corridor by 2020. However, there are a number of logical reasons that explain why travel in the North Corridor is expected to increase in spite of a more balanced jobs/housing ratio. Although the jobs/housing ratio is forecast to be more balanced in the future, the total number of both jobs and households is projected to increase markedly: jobs by 52 percent and households by 32 percent. Therefore, although the more balanced jobs/housing ratio will diminish the effects of growth in households and employment on future travel in the corridor, it will not fully counteract the effects. Trips generated by some percentage of the new households and new jobs will still need to traverse the corridor.

As a result of this additional travel demand, traffic on I-15 in the North Corridor is forecast to grow by about 23 percent by 2020. Travel in corridors such as the North Corridor is a result of many factors, not only the jobs/housing ratio. A balanced jobs/housing ratio in an area does not eliminate the need for travel. Employees do not always choose to live as near as possible to their workplaces. Many factors govern residence choice, including housing affordability and quality of schools. Also, a high percentage of household travel occurs for purposes other than commuting to work. Trips for purposes such as shopping, social, recreational, school, personal business, deliveries, and business collaboration are not directly affected by an area's jobs/housing ratio, and some trips by new residents and workers would traverse the corridor independent of the ratio of jobs to housing. Finally, approximately 65 percent of the traffic on I-15 in the North Corridor is through-corridor travel generated in north Davis and Weber Counties, as well as in growing counties and states north of the corridor. Most of this future travel demand will not be directly influenced by the jobs/housing balance available in the North Corridor.

The alternate land use assumptions submitted by UBET involve substantial shifts in future development in the region that lack reasonable support and are contrary to adopted regional and local plans and policies. They conflict with the official growth forecasts produced by the State of Utah Governor's Office of Planning and Budget and WFRC, and they are inconsistent with the official regional forecasts used in the regional long range transportation plan and the maximum future transit orientation, which was determined to be feasible by planning officials representing the corridor communities, developed for the Supplemental EIS transit integration analysis. The UBET land use forecast assumptions depart from the official WFRC forecasts for the region by arbitrarily reallocating over 37,000 jobs from northwest Salt Lake County to Weber County, Davis County, and north Salt Lake County, and by moving 41,000 residents from Weber and Davis County to Salt Lake County. These assumptions take the

reallocation/balancing of jobs and housing to extremes not envisioned by the responsible state, regional, and local agencies.

## Evaluation of Effectiveness of Alternate Land Use Assumptions

Despite concluding that the alternate land use assumptions that UBET proposed are unreasonable, the lead agencies evaluated the UBET Alternative Option 1 and the Refined Option using those proposed alternate land use assumptions. The evaluation concluded that even if land use patterns were altered as UBET proposes, the change would not affect the conclusions of the Draft Supplemental EIS concerning the relative performance of the transportation alternatives. The No-Build Alternative would still not meet the purpose and need, but the Shared Solution, which includes the Legacy Parkway, would. None of the UBET Alternative options would meet the purpose and need, even combined with the UBET's alternate set of future land use assumptions.

The lead agencies evaluated the effectiveness of UBET's proposed land use assumptions for their ability to reduce travel demand in the North Corridor. Transportation modeling analysis using UBET's Option 1 transportation system with UBET's alternate set of land use assumptions indicates that it would result in an unacceptable level of service (LOS E) in the p.m. peak period on northbound I-15 when evaluated using accepted WFRC modeling procedures. The same result was found using the Refined Option of the UBET Alternative. That is, even if the UBET suggestions for massive shifts in employment and housing were reasonable, the changes in land use forecasts would not eliminate the purpose and need for the project. The results of the modeling analysis conclude that the alternate land use assumptions do not reduce peak period peak direction travel demand in the North Corridor such that the UBET Alternative could meet purpose and need.

For a full disclosure of the literature cited; analyses performed; and tools, methods, and criteria used to evaluate the UBET-proposed alternate land use assumptions, refer to *Evaluation of UBET Proposals for North Corridor Transportation and Land Use* (Fehr & Peers 2005).

## Master Response 7—Traffic Model Evaluation

Several comments were received regarding aspects of the traffic forecasting model used to compare and evaluate potential project alternatives. In particular, commenters were interested in the model validation procedures, the model's responsiveness to factors that influence transit use, the forecasting of vehicle occupancy and HOV travel, the impacts of ramp metering and highway skim feedback on model assumptions, the forecasting of network link speeds, and the model's ability to account for induced travel. These issues are addressed in this master response. The traffic modeling is also described in detail in Appendix B, *2020 Travel Demand Analysis*, in Volume 1 of this Supplemental EIS. For a discussion of the literature cited; analysis performed; and tools, methods, and criteria used to evaluate the travel demand modeling procedures (including other technical topics such as toll road travel forecasting, effects of TSM measures, post-processing calculations for HOV and HOT demand), refer to *Evaluation of UBET Proposals for North Corridor Transportation and Land Use* (Fehr & Peers 2005).

### Travel Demand Model

As the local metropolitan planning organization, WFRC owns and maintains the travel demand forecasting model that covers the study area. The WFRC travel model was used for the Supplemental EIS analysis. It meets performance criteria established by FHWA. The WFRC travel model, version 3.2, was

the most current version available and was state-of-the-practice when the transportation analysis for the Supplemental EIS was conducted. Appendix B, *2020 Travel Demand Analysis*, of the Supplemental EIS describes the model in detail.

The modeling procedures used in the Supplemental EIS are consistent with official regional modeling protocols as used in WFRC's *Wasatch Front Urban Area Long Range Transportation Plan Update, 2004–2030* (long range plan) (Wasatch Front Regional Council 2003a) and Congestion Management System Plan (Wasatch Front Regional Council 2004) reports. The procedures applied are state-of-the-practice, as applied both regionally and nationally for transportation planning, and were enhanced for the Supplemental EIS through post-process adjustments to approximate best-practice travel demand modeling. The model and other analysis procedures used were also validated with respect to traffic and transit data from within the region and with respect to transit system performance and mode shares in comparable corridors in urban areas elsewhere.

The travel model, version 3.2, was reviewed and compared with previous WFRC travel model versions, including the version used for the Final EIS in 2000. As described in the Final EIS, Cambridge Systematics, Inc., a nationally recognized traffic-modeling firm, conducted an independent review of the WFRC model in 2000. In 2005, Cambridge Systematics reviewed the WFRC travel model, and determined that the current version 3.2 was state of the practice for travel models used by metropolitan planning organizations. The WFRC travel model had previously been evaluated by peer reviews in 1999 and 2002, which resulted in identification of suggested changes and improvements. In conducting this independent review, Cambridge Systematics found that many of the changes that appeared in version 3.2 were made in response to suggestions from these peer reviews. The Cambridge Systematics independent review of the WFRC travel model version 3.2 is included as part of the administrative record for this Supplemental EIS. The report concludes that the current version of the WFRC model is improved compared to the 2000 version, and it appears to be a reliable tool for travel demand forecasting, similar to models used in many U.S. metropolitan areas. (Rossi, Thomas. Cambridge Systematics. Memorandum to UDOT regarding review of the WFRC travel demand model. October 11, 2005.)

### ***Specific Aspects of the Travel Demand Modeling Approach***

Specific aspects of the travel demand modeling used for the Supplemental EIS are summarized below.

- **Model validation.** The model used for the Supplemental EIS accurately predicts I-15 traffic and total screenline volumes. Based on comprehensive 2004 and 2005 traffic counts, the WFRC model meets published FHWA and UDOT validation criteria in the North Corridor, including correlation coefficient and root-mean-square error. At the Woods Cross screenline, both I-15 and the total screenline model estimates were within 2 percent of the traffic counts. Model estimates for all segments of I-15 between US-89 and downtown Salt Lake City (1000 North) meet standard validation criteria.
- **Transit mode shares.** The model produces results that replicate ridership on TRAX and are comparable to premium transit in other regions, and shows similar responsiveness to variations in transit “hardware and software” as found in national research. The model was updated and recalibrated based on TRAX actual performance using the 2002 UTA on-board ridership survey. As explained in Section 2.3, *Integration of Legacy Parkway with Mass Transit*, of the Supplemental EIS and in the integration technical memorandum (Fehr and Peers 2004), the lead agencies evaluated a robust transit scenario for the Supplemental EIS, which included a number of transit enhancements beyond those included in the base WFRC travel demand model. Using this robust transit scenario, the Supplemental EIS forecasts that about 25 percent of commuters traveling to the Salt Lake City downtown area (central business district) from the North Corridor will use transit. This falls within

the range of current transit shares of riders to a central business district experienced in larger western cities: 35 percent for Denver, 18 percent for San Diego, and 31 percent for Portland.

- **Vehicle occupancy modeling and HOV use.** The model uses accurate average vehicle occupancy (AVO), as measured in comparable corridors in the Salt Lake region and more congested urban areas. The AVO outputs by the 2004 model run were compared to observed data from 2004 at various points along I-15. The observed AVO data were 1.30 and 1.24, and the AVO modeled data results were 1.30 and 1.29. This correlation indicates that the model vehicle occupancy is valid when compared to existing conditions in HOV lanes on I-15.

For HOVs, the Supplemental EIS application of the model takes a conservative approach, allowing for additional TSM and HOV incentives that might be offered in the future. Because of this approach, the Supplemental EIS assumes a greater utilization of HOV lanes than might be expected under a less conservative approach. Based on modeling and post-model adjustments, the Supplemental EIS assumes up to 1,680 vehicles per lane in the HOV facility on I-15 in the North Corridor in 2020, compared to 880 vehicles expected based on travel time advantage calculations and empirical data. The Supplemental EIS assumes that, of all traffic on a freeway segment, the maximum practicable volume (1,680), rather than the most likely volume (880), will travel in the HOV lane. The remaining traffic is allocated across the general purpose lanes, resulting in a conservative evaluation of alternatives.

- **Ramp metering.** Ramp metering was included in the modeling through assumptions of freeway capacity downstream of the metered ramps.
- **Highway skim feedback.** The highway skim feedback to trip distribution for home-based work trips in the model is state-of-practice.
- **Forecast of link speeds.** The model predicts trip times accurately. WFRC conducted a highway speed study in 2004 (Wasatch Front Regional Council. 2003. *Speed Study*. December. Salt Lake City, UT), and the results of that study show that trip times observed on roads throughout the Wasatch Front are comparable to the trip times predicted by the model for current conditions.
- **Volume delay curves.** The WFRC model volume delay curves match standard practice in travel demand models. The freeway volume delay curve is calibrated to forecast observed traffic volumes. The Supplemental EIS used the travel model to forecast traffic volumes then determined level of service by comparing those traffic volumes to level of service thresholds in the *Highway Capacity Manual* (Exhibit 23.2 in American Association of State Highway and Transportation Officials. 2000. Washington, DC.).
- **Induced travel.** An earlier version of the WFRC model (version 2.1, 2001–2003) was thoroughly tested and found to replicate the experiential effects of induced travel. (Cambridge Systematics. 2003. Wasatch Front Regional Council (WFRC) Model Sensitivity Testing and Training Study. Final Report. November.) The version of the WFRC travel model used for the Supplemental EIS (version 3.2, 2004) results in forecasts of induced travel similar to the tested model version. Version 3.2 was reviewed in 2005 by Cambridge Systematics, the same independent firm that prepared the 2003 model sensitivity study; Cambridge Systematics found version 3.2 to be a state-of-the-practice model (Rossi, Thomas. Cambridge Systematics. Memorandum to UDOT regarding review of the WFRC travel demand model. October 11, 2005.).

## Measures of Effectiveness Used to Evaluate Alternatives

The primary purpose of the proposed action is to provide capacity to help meet the travel demand through 2020 such that I-15 would operate at a minimum acceptable level of service during peak travel demand. The minimum acceptable level of service, measured as the average over a 3-hour peak period, is LOS D. The Shared Solution, including Legacy Parkway, meets the project purpose and need when evaluated using both the level of service criteria described above and other measures of effectiveness. The other measures of effectiveness are different ways to evaluate transportation system performance.

In the North Corridor, the northbound p.m. peak period is the critical peak period for analysis. The Supplemental EIS presents information about travel conditions at the Woods Cross screenline, an imaginary east/west line that cuts across all north/south transportation facilities in the corridor, as an appropriate measure of effectiveness. The following bullet points explain why the level of service of I-15 at the Woods Cross screenline, northbound in the p.m. peak period, is an accurate indicator of I-15 conditions in the entire corridor and provides a suitable basis for evaluating traffic conditions in the corridor.

- The screenline accurately represents the average level of service on all I-15 freeway segments in the corridor.
- The screenline correctly indicates whether any of the segments of I-15 would fail to meet purpose and need in 2020.
- The WFRC model has been shown to be accurate at the Woods Cross screenline, with both I-15 and the total screenline model estimates falling within 2 percent of the current traffic counts at the same locations.
- The screenline crosses all the north-south routes, providing a summary of all traffic in the corridor.

The Supplemental EIS also provides other information that can serve as indicators of the relative performance of the No-Build Alternative and the Shared Solution, including VMT, VHT, and average travel speed within the North Corridor. These all demonstrate that the Shared Solution provides superior mobility compared to the No-Build Alternative, including up to 42 percent reductions in p.m. peak traffic delays and 72 percent improvements in p.m. peak travel speeds. While comparisons of VMT, VHT, and speed within the North Corridor can be useful, measuring the differences between alternatives in the context of the overall regional VMT, VHT, and speed is less helpful. At the regional level, there is very little difference in VMT, VHT, or speed between the alternatives. Therefore, the regional criteria proposed by UBET, including regional VMT, VHT, and VMT per capita reveal only very small differences (less than one-third of 1 percent) among the alternatives and are less useful than corridor-specific comparisons.